CLAIMS

1. Lens system for a plurality of charged particle beams, comprising

at least two lens modules (100, 200, 301), each comprising a first pole piece, a second pole piece and at least one opening (22) for a charged particle beam;

at least one excitation coil (21; 106) providing a magnetic flux to the at least two lens modules;

whereby each lens module constitutes a component.

2. Lens system according to claim 1, whereby one charged particle beam travels through each of the openings, thereby being focused in a lens field area.

3. Lens system according to any of the preceding claims, whereby the center of each opening provides an optical axis (24) and whereby a lens field corresponding to each opening has at least two planes of symmetry (102, 104) with respect to its optical axis.

4. Lens system according to any of the preceding claims, whereby the openings of all lens modules sharing one excitation coil form a row of openings.

5. Lens system according to any of the preceding claims, whereby at least four openings are provided within one row, thereby increasing symmetry for each opening with respect to its optical axis.

6. Lens system according to any of the preceding claims, whereby the at least one excitation coil has a non-circular shape.

7. Lens system according to any of the preceding claims, whereby the at least one excitation coil (21) has substantially the shape of a rectangle with rounded edges.

8. Lens system according to any of the preceding claims, whereby at least two lens rows (130) each comprising an excitation coil and at least two lens modules are arranged next to each other to form a two-dimensional arrangement of openings (22).

9. Lens system according to any of the preceding claims, whereby at least two lens modules are arranged to form a two-dimensional arrangement of at least four openings and thereby sharing one excitation coil.

10. Lens system according to any of the preceding claims, whereby the openings for the charged particles have at least in one direction a distance with respect to each other of about 10 mm to 90 mm, preferably of about 30 mm to 65 mm.

11. Lens system according to any of the preceding claims, whereby each row of lens modules is terminated at its ends by a shielding plate (702).

12. Lens system according to any of the preceding claims, whereby each lens module is positioned in relation to an adjacent module by providing a gap (62) of about 0.1 mm to 3mm.

13. Lens system according to any of the preceding claims, whereby the gap contains a non-magnetic material (64).

14. Lens system according to any of the preceding claims, whereby each lens module comprises magnetic flux shaping openings (82).

15. Lens system according to any of the preceding claims, whereby for each magnetic sub-lens an electrostatic immersion lens is provided.

16. Lens system according to any of the preceding claims, whereby each electrostatic immersion lens comprises at least two electrodes (92,94).

17. Method for manufacturing a lens system, comprising the steps of

manufacturing a plurality of lens modules, each comprising a first pole piece, a second pole piece and at least one opening for a charged particle beam; and

providing a common excitation coil for at least two lens modules.

18. Method according to claim 17, whereby each module is manufactured by first providing a cylindrical intermediate product and then flattening at least two sides of the cylindrical intermediate product.

19. Method for manufacturing a lens system according to any of claims 1 to 16, comprising the steps of

manufacturing a plurality of lens modules, each comprising a first pole piece, a second pole piece and at least one opening for a charged particle beam; and

providing a common excitation coil for at least two lens modules.

20. Method according to claim 19, whereby each module is manufactured by first providing a cylindrical intermediate product and then flattening at least two sides of the cylindrical intermediate product.

21. Lens system for a plurality of charged particle beams, comprising

an excitation coil (21) providing a magnetic flux to a pole piece unit;

the pole piece unit (501) comprising a first pole piece, a second pole piece and at least two openings (22) for charged particle beams; and

whereby the openings are arranged in one row, thereby forming a lens row; and

whereby the pole piece unit has an elongated shape.

22. Lens system according to claim 21, whereby the excitation coil (21; 106) has a non-circular shape.

23. Lens system according to any of claims 21 to 22, whereby the excitation coil has a rectangular shape with rounded edges.

24. Lens system according to claim 23, whereby the edges are rounded such that the sides of the rectangular shape form a semi-circle.

25. Lens system according to any of claims 21 to 24, whereby at least four openings (22), preferably at least seven openings, are provided within one row, thereby increasing symmetry for each opening with respect to its optical axis (24).

26. Lens system according to any of claims 21 to 25, whereby one charged particle beam travels through each of the openings, thereby being focused in the lens field area.

27. Lens system according to any of claims 21 to 26, whereby the center of each opening (22) provides an optical axis (24) and whereby a lens field corresponding to each opening has substantially at least two planes of symmetry (102, 104) with respect to its optical axis.

28. Lens system according to any of claims 21 to 27, whereby at least two lens rows, each comprising an excitation coil, are arranged next to each other to form a two-dimensional arrangement of openings.

29. Lens system according to any of claims 21 to 28, whereby the openings for the charged particles have at least in one direction a distance with respect to each other of about 10 mm to 90 mm, preferably of about 30 mm to 65 mm.

30. Lens system according to any of claims 21 to 29 whereby each lens row is terminated at its ends by a shielding plate (160; 702).

31. Lens system according to any of claims 21 to 30, whereby the pole piece unit (501) comprises magnetic flux shaping openings (82).

32. Lens system according to any of claims 21 to 31, whereby for each magnetic sub-lens an electrostatic immersion lens is provided.

33. Lens system according to claim 32, whereby each electrostatic immersion lens comprises at least two electrodes (92, 94).

34. Multiple charged particle beam device, comprising

a charged particle beam source;

a detector for detecting secondary particles;

beam shaping means;

a housing for the charged particle beam column, whereby the housing can be evacuated;

at least one lens system according to any of claims 1 to 16 or 21 to 33.